

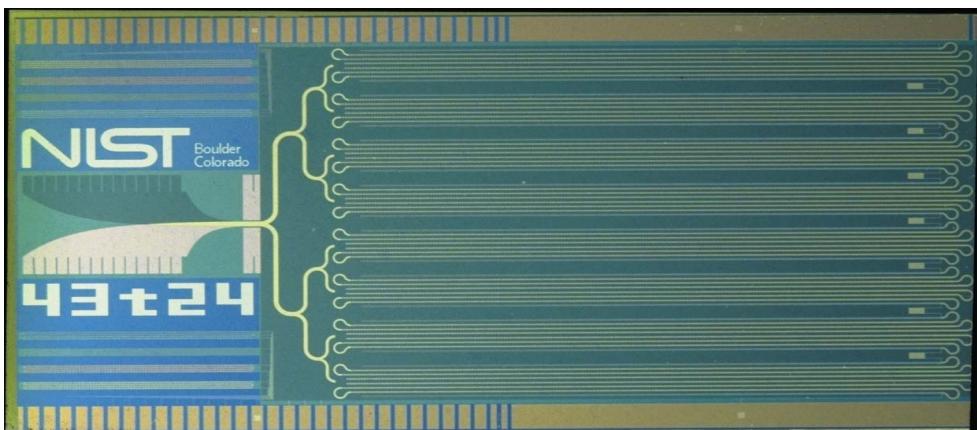
Quantum Measurements and Standards Based on Condensed-Matter Physics

by Richard E. Harris

Wednesday, March 10, 2004

10:30 a.m., Green Auditorium

A metrologist often looks for small, naturally occurring quanta to use as rulers. Time is measured by counting oscillations in a cesium atom; length, by the number of wavelengths of a laser beam. A seemingly very tangible example is length determined by the number of atomic planes in nearly perfect silicon crystals. Condensed-matter physics reveals other quanta in low temperature materials such as superconductors. Drawing on work on these systems by my colleagues at NIST and elsewhere, I will describe how they lead to voltage standards, current and capacitance standards, Johnson noise thermometry, and ultra-sensitive arrays of infrared and x-ray sensors.



A NIST-produced, 10-volt dc voltage standard containing more than 20,000 Josephson junctions.

Dr. Harris received his Ph.D. in physics from the University of Illinois and the B.S. in physics from the University of Rochester. He has been at NIST almost 30 years and has been awarded both the Gold and Silver Medals of the Department of Commerce. He is the Group Leader of the Quantum Devices Group of the Quantum Electrical Metrology Division (EEEL).